

Geoff Vickery
SNC Lavalin Inc.
1800 – 1075 West Georgia Street
Vancouver, BC V6E 3C9

January 12, 2015

Dear Geoff:

Re: Work Assignment Letter #1 for Contract #038CS93254
Balfour Ferry Terminal Relocation Project – Technical Feasibility Study

This work assignment letter (WAL) is your authority to provide the services under the above referenced contract. Kindly proceed with the services outlined below:

Scope

Undertake a technical feasibility study for the planning and project development work in sufficient detail to ascertain the feasibility of replacing the existing Balfour Ferry Terminal on Kootenay Lake with a similar berth in a more suitable and technically feasible location; and provide a recommendation, along with the information necessary, for the Ministry to make an informed decision on an optimum berth location.

The work plan shall be as outlined in SNC Lavalin's Proposal Letter dated January 9, 2015 (attached hereto) and include the following key tasks and deliverables taking into account the diverse constraints and implications of each site:

Tasks:

- Review Previous Study Work
- Analyze Viable terminal Locations
- Traffic Forecast Analysis
- Vessel Capacity Analysis
- Land Title Search
- Environmental Overview Assessment
- Archeological Overview Assessment
- Bathymetry Survey
- Ground Contours Review
- Utilities Review
- Desktop Geotechnical Review
- Desktop Metocean Review (wind/wave/currents)
- Conceptual Cost Estimate

- Design Criteria Document
- Preliminary Concept Drawings
- Site Assessment Matrix
- Sewage Treatment Study
- Stakeholder Relations Plan (provide assistance & support to other Consultant)

Deliverable:

- **Balfour Terminal Relocation Study Report:** The report will aggregate all the tasks and study findings to provide a recommendation on a preferred terminal location complete with rationale as to how and why the preferred location will achieve the best long term solution for addressing the issues on the Kootenay Lake crossing, and specifically include confirmation of why the recommended location is preferable against the existing location.

Schedule

- May 15, 2015 - Draft Report Submission
- June 15, 2015 - Final Report Submission

Status update meetings will be held monthly during the assignment.

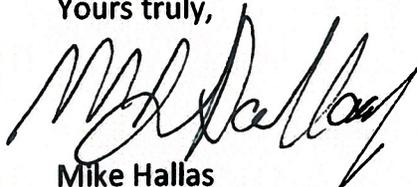
Fees/Rates

The total estimated price is **\$198,450** excluding taxes based on the hourly rates and expenses in Contract#038CS93254, and is not to be exceeded unless approved in advance in writing by the Ministry.

Payment for these services will be made monthly in arrears upon satisfactory completion of the services. Please provide any supporting receipts with your invoice and ensure **WAL # 1** and **Contract # 038CS93254** are referenced on all invoices.

Kindly acknowledge receipt of this work assignment by signing below, and returning same to the undersigned via email Mike.Hallas@gov.bc.ca.

Yours truly,



Mike Hallas
Manager, Project Management
Support Services



Receipt is hereby acknowledged
SNC Lavalin Inc.

Cc: Layle Lintern, Marine Manager, Marine Branch, MOTI



SNC • LAVALIN



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January 9, 2015

Mr. Mike Hallas
Manager, Project Management Support Services
Planning and Programming Branch
Ministry of Transportation and Infrastructure
940 Blanchard Street
Victoria, British Columbia
V8W 3E6

Dear Mike

Subject: Balfour Ferry Terminal Relocation Project – Technical Feasibility Study
Consulting Services Contract for Engineering and Inspection Services for
Marine Structures (038CS93254)

In response to a request from The Ministry of Transportation & Infrastructure (the Ministry), SNC-Lavalin Inc. (SLI) is pleased to submit this letter proposal to undertake a technical feasibility study for the planning and project development work in sufficient detail to ascertain the feasibility of replacing the Balfour berth on Kootenay Lake with a similar berth in a more suitable and technically feasible location.

PROJECT UNDERSTANDING

The Balfour Ferry Terminal is in need of various improvements in the near term due to an aging dock, a parking facility in need of paving, and the requirement to provide modern methods of sewage treatment. In addition, draft issues, pleasure boat traffic, and congestion near the ferry berth has resulted in a safety risk.

Coupled with the desire to retire the old ferry M.V. Balfour, the Ministry is proceeding with planning and project development work to determine the feasibility of relocating the Balfour ferry terminal. An earlier concept study¹ reviewed the merits of the berth relocation from Balfour to select locations further north in Queens Bay. The earlier study was conceptual in nature, and requires further development in order for the Ministry to be assured all issues have been analysed. This letter proposal describes how SLI will go about expanding on the earlier studies, and provide to the Ministry the necessary analysis to fully understand the challenges and implications of a new berth location, along with tangible recommendations, including confirmation of the technical feasibility of constructing and operating on the preferred site.

¹ WorleyParsons Canada - Queens Bay Concept Study - June, 2012



WORK PLAN

SLI proposes the following work plan to methodically expand upon the earlier study work, and to provide the Ministry with the information necessary to make an informed decision on the optimum berth location taking into account the diverse constraints and implications of each site:

Technical Analysis

- Review Previous Study Work
 - A thorough review of the previous study work will be undertaken.
- Analyze Viable Terminal Locations
 - The analysis will focus on viable site locations (north and south) in Queens Bay, and the study of these locations will be compared back to the existing Balfour location.
- Traffic Forecast Study
 - Review of traffic operation and forecast, in conjunction with available holding compound and interaction with Highway 31 turn-off at the selected terminal locations.
- Vessel Capacity Analysis
 - A spreadsheet capacity review (traffic & service level analysis) will be performed to quantify the benefits (if any) for the berth relocation with respect to increased ridership.
 - Serviceability and reliability issues will be reviewed, focusing on the benefits and disadvantages of reducing the vessel fleet to one, should it turn out that a shorter transit time leads to sufficient capacity with one vessel to carry the traffic. We will work with Operations staff to identify pertinent issues that may arise.
- Land Title Search
 - A land title search will be undertaken on property potentially affected by the terminal relocation.
- Environmental Overview
 - Undertake an environmental overview of the following areas:
 - Fish and aquatic habitat, including riparian areas;
 - Watercourse classification,
 - Wildlife and wildlife habitat,
 - Vegetation, and
 - Potential presence of species at risk or provincially listed species.
 - A document which identifies work performed, findings, potential issues and impact and recommendations will be prepared.



- Archaeological Overview
 - A preliminary field reconnaissance assessment will be conducted. The scope of work will include:
 - Conducting literature reviews of all archaeological reports / maps on record with the Provincial Archaeology Branch, Ministry of Tourism, Sport and the Arts, for a designated project area,
 - Identification of areas having high or elevated potential for containing archaeological and/or cultural resources,
 - Conducting RAAD (Remote Access Archaeological Database) searches, and
 - Evaluating the significance of all archaeological sites for a designated project area.
 - A document which identifies work performed, findings, potential issues and impact and recommendations will be prepared.
- Bathymetry Survey
 - A bathymetry survey will be undertaken in Queens Bay North and Queens Bay South to confirm water depths for potential berth locations and at the existing Balfour Terminal.
- Ground Contours (LIDAR)
 - We assume that the Ministry has, or will be able to obtain, LIDAR information. This information will be used to develop the foreshore terminal assets and road transition from Highway 31.
- Utilities Review
 - A review of any potential utilities lines (underground, overhead, underwater) at or near the potential preferred location which could impact terminal construction and ferry operation. (i.e. water, hydro, telephone, sewer, etc.)
- Desktop Geotechnical Review
 - A desktop geotechnical review will be performed to better understand the construction challenges for road, terminal and marine piling.
 - This desktop review will use publicly available and Ministry data.
 - Physical geotechnical studies will be deferred to subsequent design phases once the preferred location is chosen.
- Desktop Metocean Review
 - A desktop metocean review will be performed to better understand vessel handling issues and berth orientation requirements.
 - This desktop review will use publicly available and Ministry data.
 - Physical metocean studies, if necessary, will be deferred to subsequent design phases once the preferred location is chosen.
- Conceptual Cost Estimate (25%)
- Design Documentation
 - A design document / design criteria will be prepared including:
 - Functional requirements,
 - Service life,
 - Design standards / design codes,
 - Structural loads.



- Preliminary Sketches
 - Preliminary layout sketches for the north Queens Bay location and the south Queens Bay will be developed.
- Site Assessment Matrix
 - A site assessment matrix comparing the preferred terminal sites will be developed.
- Report and Recommendations
 - A Balfour Ferry Terminal Relocation Report will be developed to aggregate the study findings, and will include a recommendation on the preferred terminal location complete with rationale.
- Sewage Treatment
 - A study will be undertaken to quantify the necessary holding capacity on board the vessel.
 - A review of options for treatment (tie-in to sanitary system on land, pump out and remote disposal, septic system, on-board treatment on the M.V. Osprey 2000) will be undertaken.
- Stakeholder Relations Plan
 - We will assist the Ministry with the development of a stakeholder relations plan, including community interaction. If requested, SLI can undertake to be the Lead in the development of this plan.

PROJECT TEAM

SLI proposes an experienced team to carry out this assignment. Our personnel have a considerable depth of technical experience and practical “know-how” with similar projects.

Our Senior Advisor for this project will be Tom Tasaka, P. Eng. Tom will facilitate project delivery to satisfy the Ministry needs. Tom is well known with the Ministry, having successfully worked on many inland ferry projects over the past 40 years. For the past 20 years, he has specialized in the development, project management and implementation of several key transportation infrastructures, including marine terminals, port facilities, ferries, highways and bridges. Prior to this, he managed the operations and maintenance of a large section of the provincial highway network and directed the design, construction, reconnaissance, feasibility and preventative maintenance program for all public ferry terminals in the Province of British Columbia.

Mr. Tasaka combines the insight, practical experience and professional expertise critical to the successful development, management, coordination, implementation, operations and maintenance of transportation projects. Moreover, his ability to liaise effectively with the client, management and government agencies ensures the best solutions for project issues. Tom will be committed to this project, and working with the Project Manager and Ministry staff, throughout its entire duration

The project will be led out of Vancouver by our Project Manager, Keith Dunbar, P. Eng. Keith will work closely with Tom and the Ministry to develop the project objectives, and will be instrumental in developing the majority of the study components. Keith has 30 years of experience and has managed a diverse range of marine and terminal



projects, ranging from scoping studies, pre-feasibility / bankable feasibility studies, and construction. Keith is also experienced with the development of Contract specifications and tender documents, bid evaluations and recommendations, and subsequent Contract management services (site supervision, contractor progress payments, shop drawing review, claims management), useful for subsequent stages of project development.

Metocean review will be undertaken by Grant Lamont, M.A.Sc., P.Eng. Grant is a senior coastal and metocean engineer in SLI's Ports & Marine Group. He has been a discipline lead for a variety of projects ranging from large harbour developments to small shoreline restorations. His experience includes concept design, construction supervision, managing field data collections, and the application of physical model studies for detailed design.

Environmental and archeological overview assessment will be undertaken by Martin Stol, R.P Bio., within SLI's Environment and Water Resources group in Nelson, B.C.

Desktop geotechnical engineering review will be undertaken by Jorge Antunes, M.A.Sc., P.Eng. Jorge's 26 years of experience include site investigation, slope stability analysis, geohazard risk management, surfacing designs, material specifications, geometric design, slope stability analysis, construction administration, geotechnical instrumentation, remote monitoring, as well as geological site interpretation for engineering-based works.

Traffic engineering will be undertaken by Robert Cheng, P. Eng. Robert is a Senior Transportation Specialist with 25 years of extensive and diverse experience in transportation planning and traffic engineering. Robert has provided senior level advice on traffic and transportation issues to various agencies, as well as working with land use planning staff to develop balanced approaches to city planning.

Upland civil works, road and holding compound design, and sewage requirement review will be undertaken by Satwant Deepak, P. Eng. Satwant has over 33 years of professional experience involving feasibility studies, functional planning, preliminary and detailed design, implementation and project management for roads and highways, municipal-infrastructure rehabilitation, land development and airports.



A listing of key personnel is indicated in Table 1 below and resumes are available upon request.

Table 1 - Key Personnel

Role	Name
Resource Lead	Tom Tasaka
Project Manager	Keith Dunbar
Senior Coastal Engineer	Grant Lamont
Environmental / Archeological	Martin Stol
Senior Geotechnical Engineer	Jorge Antunes
Bathymetric Survey	Local Marine Surveyor
Senior Traffic Engineer	Robert Cheng
Senior Civil Engineer	Satwant Deepak

MINISTRY MEETINGS AND INPUT REVIEW OPPORTUNITIES

Time has been included in the estimate to allow for review meetings with the Ministry and to incorporate Steering Committee comments. An allocation of four meetings (two in Vancouver and two in Victoria) has been provided for.

POTENTIAL CHALLENGES AND ISSUES

The following challenges and issues will need to be anticipated when undertaking this terminal relocation study:

- Community Engagement
 - There are numerous private properties in the vicinity of terminal relocation sites, and “not-in-my-backyard” concerns are highly likely within the community. Public consultation will be very important and will be carefully formulated in the stakeholder relations plan.
- Site Selection
 - Site selection must carefully consider a balance between shortening ferry travel distance (increased capacity), and upland terminal infrastructure elements (road grades, proximity to private lands).



- Terminal Design
 - It will be essential that the terminal and berth be carefully designed to allow, to the extent possible, the largest number of suitably qualified contractors for the marine installation contract. The site is not necessarily remote, but specialized equipment for pile driving and for installation of the main vehicle ramp and other structural elements will be required. An experienced contractor with the necessary resources will be crucial in meeting the needs of this contract in a timely manner.
- Permitting
 - Permitting will involve multiple sensitive interfaces with environmental, governmental, and public interest stakeholders, and the road plan for permitting development will need careful review in the study phase of the project.
- Infrastructure Costs
 - Costs will be commensurate with location and design, and careful design will be needed to ensure these costs are minimized.

SCHEDULE

The SLI team are available to work on this project immediately following authorization to proceed. On the assumption that topographical Lidar information will be available and that the bathymetry work proceeds expeditiously, it is expected that a draft copy of the Balfour Ferry Terminal Relocation study report will be submitted to the Ministry for comments (16) weeks from authorization to proceed.

EXCLUSIONS

The following elements are excluded from the Scope of Work:

- Detailed geotechnical investigations and factual / interpretative report, including seismic design loading characteristics.
- Topographical field survey. It is assumed that Lidar data will be available and that this level of detail will be sufficient at this stage in design.
- Leading the Stakeholder Relations Plan, assumed to be undertaken by the Ministry's Consultant.
- Lidar acquisition (assumed available, or obtainable by the Ministry)

ESTIMATED FEES AND RATE SCHEDULE

The estimated fees for the ramp relocation work and related activities are summarized below in Table 2.



Table 2 – Technical Feasibility Study - Estimated Fees (CAD\$)

Services	Hours	Fees	Disbursement	Total
Totals	1,308	\$184,000	\$14,450	\$198,450

SLI proposes to complete this assignment on a cost-reimbursable fee basis, with an upset cost of \$184,000. Disbursements of \$14,450 are estimates and will be charged at cost.

This fee estimate is based on our understanding of the scope of work described above. If additions to scope are necessary, SLI will provide the Ministry with an estimate of the required effort for approval prior to initiating. SLI will follow the agreed upon rates per our Engineering and Inspection Services Agreement with the Ministry.

CLOSING

SNC-Lavalin appreciates the opportunity to submit this proposal and work with the Ministry on this interesting project. If you have any questions or comments regarding this proposal, please contact Keith Dunbar at (604) 605-4997 (direct), or the undersigned.

Yours sincerely,

SNC•LAVALIN INC.

Geoff Vickery, Vice President
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